

## REMARKS/ARGUMENTS

Claims 9-16 are pending herein. Claims 9 and 16 have been rewritten to recite a single vibration source for changing the volume of at least two of the pressure chambers of the liquid sump. Applicants respectfully submit that support for rewritten claims 9 and 16 can be found in paragraphs [0017], [0022] and [0023] of the substitute specification filed on August 26, 2003, for example. Claim 11 has been amended hereby merely to correct minor matters of form, as supported by original claim 3 and paragraphs [0011] and [0029] of the substitute specification filed on August 26, 2003. Claim 13 has been amended hereby to merely correct a minor matter of form and for clarification purposes only. Applicants respectfully submit that no new matter has been added.

1. In section 2 of the pending Office Action, Examiner Kim asserted that the response papers filed on August 26, 2003 did not respond to paragraph 1 of the prior Office Action, which was reproduced in section 4 of the pending Office Action. Applicants respectfully submit, however, that a substitute Declaration acknowledging the foreign application from which priority is claimed was filed with the last Amendment on August 26, 2003. Applicants respectfully submit that the deficiency of the original Declaration was corrected by the substitute Declaration filed August 26, 2003.

Attached hereto as Appendix A is a copy of the substitute Declaration, as filed on August 26, 2003, along with a copy of our postcard receipt. Applicants respectfully request that Examiner Kim acknowledge receipt and consideration of the substitute Declaration.

2. The drawing objection in section 5 of the Office Action is noted, but deemed moot in view of the Replacement Drawing Sheet attached hereto as Appendix B following page 11 of this Amendment, which includes amended Fig. 3. Figure 3 has

been amended as described on page 5 of this paper. Accordingly, Applicants respectfully request that the above objection be reconsidered and withdrawn.

3. The objection to the specification is noted, but deemed moot in view of paragraph [0011] of the substitute specification filed on August 26, 2003, and in view of substitute specification paragraph [0029] and rewritten claim 11 submitted above.

That is, Applicants respectfully submit that paragraph [0011] of the substitute specification clearly provides antecedent basis for the “fixation section” recited in rewritten claim 11. The term “fixation member” in claim 11 has been changed to “fixation section,” to correct a minor terminology inconsistency, as supported by original claim 3 and paragraph [0011].

Further, Applicants respectfully submit that substitute specification paragraph [0029] has been amended hereby, in connection with amended Fig. 3, to clarify that the base frame 13c constitutes a fixation section. Applicants respectfully submit that no new matter has been added, since support for amended Fig. 3 and amended substitute specification paragraph [0029] submitted above can be found in paragraph [0011] of the original specification, and in original claim 3, for example.

For at least the foregoing reasons, Applicants respectfully request that the above objection be reconsidered and withdrawn.

4. Claims 9-16 were rejected under §112, second paragraph in sections 8-9 of the Office Action. Applicants respectfully submit that this rejection is moot in view of rewritten claims 9, 13 and 16 submitted above, and for the reasons explained below.

Rewritten claim 9 recites a liquid-drop spraying device comprising a liquid sump comprising a plurality of pressure chambers. Each pressure chamber includes an outlet and an inlet in communication with a common fluid supply passage via an inlet passage. The liquid sump also includes a single vibration source for changing the volume of at least two of the plurality of pressure chambers of the liquid sump.

Independent claim 16 recites a method for forming a liquid-drop spraying device including a liquid sump having a single vibration source for changing the volume of at least two of the pressure chambers of the liquid sump.

In the Office Action, Examiner Kim asserted that “it is uncertain what includes at least two of said plurality of pressure chambers” (Office Action, section 8, lines 4-5). Although Applicants do not concede to Examiner Kim’s assertion, rewritten claims 9 and 16 clearly recite a single vibration source for changing the volume of at least two of the plurality of pressure chambers of the liquid sump.

Applicants respectfully submit that support for rewritten claims 9 and 16 can be found throughout the specification, but specifically, for example, in paragraphs [0017], [0022] and [0023]. For example, in the context of Fig. 1, Applicants respectfully submit that, when activated, the single vibration source 13 changes the overall volume of the liquid sump, including the individual volumes of each of the two pressure chambers 10. That is, the structural volume of each of the two pressure chambers 10 physically changes in response to the singular vibration source 13.

Applicants respectfully submit that support for rewritten claim 13 can be found throughout the specification and in Figs. 1 and 4, for example, which clearly show that the vibration source has a flat vibration transmission surface.

For at least the foregoing reasons, Applicants respectfully request that the above rejection be reconsidered and withdrawn.

5. Claims 9, 10 and 15 were rejected under §102(b) over Yao in section 11 of the Office Action. Applicants respectfully traverse this rejection.

Independent claim 9 is discussed in section 4, above.

In the Office Action, Examiner Kim asserted that “Yao et al. discloses a liquid-drop spraying device comprising: a liquid sump 20 including an outlet 22 and inlet 19; a common fluid supply passage 11; a vibration source 16” (Office Action, section 11, lines 3-5).

Following Examiner Kim's own characterization of Yao, however, Applicants respectfully submit that the alleged "liquid sump 20" clearly does not include a plurality of pressure chambers, as recited in claim 9. Further, Examiner Kim's characterization of Yao also completely lacks any reference whatsoever with respect to the feature of claim 9 that recites a single vibration source for changing the volume of at least two of the pressure chambers. Applicants respectfully submit that, for these reasons alone, this rejection should be reconsidered and withdrawn.

Further, Applicants respectfully submit that even if Examiner Kim attempted to broadly assert that the tubes 20 of Yao correspond to a plurality of pressure chambers, as claimed, Applicants respectfully submit that the volume of Yao's tubes 20 does not change (and cannot change) in response to the vibration source 16. That is, the physical volume of the tubes 20 does not change when Yao's piezoelectric crystal 16 transmits a mechanical pulse to the bottom plate 12 of the reservoir 11 to cause droplets to discharge from the orifice 22 (see Yao, Col. 2, lines 50-54 and Fig. 1, for example).

Further, Applicants respectfully submit that the closed reservoir 11 of Yao is clearly the only pressure chamber, that is, the only chamber that experiences a **volume** change in response to the vibration source 16, and that this singular pressure chamber is not a plurality of pressure chambers, the volumes of which change in response to a single vibration source, as recited in claim 9.

For at least the foregoing reasons, Applicants respectfully submit that claims 9, 10 and 15 clearly define patentable subject matter over Yao. Accordingly, Applicants respectfully request that the above rejection be reconsidered and withdrawn.

6. Claims 9-14 and 16 were rejected under §102(b) over Perduijn in section 12 of the Office Action. Applicants respectfully traverse this rejection.

Independent claim 9 is discussed in section 4 above. Claims 10-14 depend, either directly or indirectly, from independent claim 9.

Independent claim 16 recites a liquid-drop spraying device that is formed by a method comprising the steps of providing a liquid sump comprising a plurality of pressure chambers each having an outlet and an inlet in communication with a common fluid supply passage via an inlet passage, providing a single vibration source for changing the volume of at least two of the plurality of pressure chambers of the liquid sump, and integrating the liquid sump and the vibration source. The liquid sump and the vibration source are separately provided as separate members before the integrating step, and at least two of the pressure chambers of the liquid sump are provided with respect to the vibration source such that vibrations generated by the single vibration source are transmitted to the liquid sump to change the volume of at least two pressure chambers.

In the Office Action, Examiner Kim asserted that “Perduijn discloses a liquid-drop spraying device comprising: a liquid sump 3 including an outlet 15 and inlet 17; a common fluid supply passage 19; a vibration source 9, 23, 25; and fixation member 39, 43” (Office Action, section 12, lines 3-5).

Based on Examiner Kim’s own characterization of Perduijn, however, Applicants respectfully submit that the “liquid sump 3” of Perduijn does not, in fact, contain a plurality of pressure chambers, since Perduijn’s cylindrical tube 3 itself is not a sump but instead just one of a plurality of pressure chambers provided in the embodiment shown, for example, in Figs. 4-7 of Perduijn.

For that reason alone, Applicants respectfully submit that claims 9 and 16 define patentable subject matter over Perduijn.

Further, even if each of Perduijn’s cylindrical tubes 3 are taken to be one of a plurality of pressure chambers instead of an entire liquid sump, Applicants respectfully submit that a separate pumping section 7 is dedicated to each of Perduijn’s cylindrical tubes such that a single vibration source does not actually change the volume of at least two of the pressure chambers 3. In fact, Perduijn specifically discloses that the *multiple* pumping sections 7 (consisting of the tube 9 of approximately radially polarized piezoelectric material provided with electrodes on the internal and external

surfaces thereof) are “completely separated from one another by the separating planes 51” (see Perduijn, Fig. 7 and Col. 5, lines 27-28). In that manner, Applicants respectfully submit that the *multiple* vibration sources, which Examiner Kim designated as 9 (and the plates 23 and 25 that make up 9), are actually singulated and do not, by design, interact or interfere with each other. As such, each “vibration source” of Perduijn is not a single vibration source and does not actually change the volume of more than one of the cylindrical tubes 3 *specifically by design*.

Since Perduijn does not disclose even the basic structure of the liquid-drop spraying devices recited in independent claims 9 and 16, Applicants respectfully submit that there is no disclosure of the method steps recited in independent claim 16 by which the structure of the liquid-drop spraying device is formed.

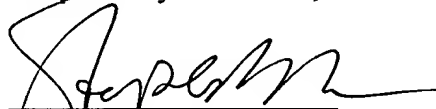
For at least the foregoing reasons, Applicants respectfully submit that all claims pending herein define patentable subject matter over the art of record. Accordingly, Applicants respectfully request that the above rejection be reconsidered and withdrawn.

If Examiner Kim believes that contact with Applicants’ attorney would be advantageous toward the disposition of this case, he is herein requested to call Applicants’ attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

February 13, 2004  
Date

Respectfully submitted,



Stephen F. Burr  
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SPB/NB/gmh

Attachments:           Appendix A - copy of the substitute Declaration filed on  
  August 26, 2003 with our postcard receipt  
  Appendix B - Replacement Drawing Sheet

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